

TMDL Implementation Plan
for
Muckalee Creek
in
Sumter County

prepared by
Middle Flint Regional Development Center

March 31, 2001
revised
April 12, 2001

Muckalee Creek – Upstream Americus
Middle Flint River Basin, Sumter County

Background

On the basis of an insufficient number of water samples collected in 1995, and subsequently processed employing the most probable number procedure, a segment of Muckalee Creek upstream of Americus was placed on the 303d list. Collection methodology did not conform to commonly accepted standards concerning fecal coliform sampling of recreational waters. The Flint River Basin Management Plan 1997 acknowledges sampling was not conducted at a sufficient frequency to enable a definitive determination of whether the monthly geometric mean criterion specified in the state water quality standard was actually violated.

Accepted procedure calls for at least four samples collected within a thirty-day period at intervals of not less than twenty-four hours. In the geometric means calculated therefrom, fecal coliforms are not to exceed 200 cfu/100 ml for the months of May through October, and 1000 cfu/100 ml during the months of November through April. Any one sample must not exceed 4000 cfu/100 ml. All nine samples taken at the Muckalee collection site met this threshold. However, in the absence of data sufficient to generate a monthly geometric mean, EPA directed that a 400 cfu/100 ml threshold be applied to samples collected during the months May-October. The August sample (1100 cfu) taken at Muckalee Creek exceeded this EPA threshold.

Furthermore, the computer model used does not appear to provide adequately for the effects of rainfall. Recent research by Stone Barrett (South Carolina Department of Health and Environmental Control) and Hank McKellar (University of South Carolina) indicate sharp increases in coliform levels, from 200 cfu/100 ml in base flow to >2000 cfu/100 ml in storm flow, were found throughout watersheds with peaks in forested areas. Five of the Muckalee samples were collected during steady state conditions and revealed counts significantly lower than the August 21 sample collected the day after a major rain event (4" total during the two days immediately preceding the sample).

Despite questionable sampling methodology and modeling parameters, the Muckalee Creek TMDL reduction strategy for obtaining and maintaining the fecal coliform target level of 175 ccu/100 ml has been set at a 50% reduction in loading and/or resultant concentrations from agriculture or pasture land uses and at a 50% reduction in loading and/or resultant concentrations from urban land uses

Stakeholder Participation

Owners of land contiguous to the impaired segment of Muckalee Creek were identified from courthouse tax records. Local government officials, environmental health officers from the health department, scientists from Georgia Southwestern State University, Farm Bureau officers and agricultural experts from the County Extension Offices and Natural Resources and Conservation Service were also identified. After a newspaper article, publication of a public meeting notice and the mailing of thirty-three personalized invitations, some including introductory video-cassette tapes, twenty-two attended the March 19 meeting. The meeting opened with presentation of the fifteen-minute videocassette tape Watershed Wisdom, after which the purpose of the meeting was clearly explained. During the two-hour meeting participants shared their knowledge of possible contributing sources and suggested possible corrective measures.

Activity Coincident to Water Quality Sampling Which Led to 303d Listing

The Plant Materials Center operated by the U.S. Department of Agriculture is believed to have been the only livestock operation active at the time of the 1995 sampling. Located only 3,000 feet upstream of the collection site, the Center applies BMPs on open grazing with a small herd of cattle. At no time have the animals had access to the creek or any tributary of the Muckalee. Any other cattle farms in existence at that time were small utilizing open pasture. Previous research (Smith, et al.) suggests that pastured watersheds typically record among the lowest fecal coliform counts.

Poultry has made significant contributions to the area agricultural economy over the past decade. Local agricultural experts indicate land application of litter in this watershed has been minimal. The generally level topography so prevalent in the area serves to reduce the amount of runoff, and farmers time land application of the waste with their ability to till the soil to retain the nutritional value of the waste.

The only possible agricultural source which could be identified was a hog farm of significant size in an adjoining county. The site is on an upper reach of the Muckalee, approximately fifteen-eighteen creek miles upstream from the beginning point of the impaired segment. Considering the ± 10 day life span of fecal coliform and the wetland area through which the dissolved waste must pass, it is not yet known whether this could be a significant contributor of the environmental stressor.

Sumter County landowners have been among state leaders in utilizing the Conservation Reserve Program (CRP), and to a lesser degree the Wetlands Reserve Program (WRP). In 1997 only eighteen Georgia counties had more acres in CRP and WRP than Sumter. Whether planted in grass buffers or pine seedlings, the CRP program has the effect of truncating the transport of fecal coliform which may be in storm wash from farm animal operations, and filtering same prior to discharge into surface water sources.

Other possible nonpoint sources of fecal coliform include leaking sanitary sewer pipes and illicit connections and septic tank seepage. The City of Buena Vista operates a municipal wastewater treatment facility in a neighboring county on the headwater of the Muckalee, approximately twenty-five creek miles upstream of the beginning point of the impaired segment. Because it is a point source discharge site and is regularly monitored for NPDES compliance, it is not addressed in this implementation plan. Due to the distance and lifespan of fecal microbes the possibility of leaking pipes and illicit connections are not here considered a contributor.

A 1992 survey revealed the presence of approximately 200 Sumter County single-family residences distributed throughout this sub-basin, and a subdivision (Hidden Lakes-1980s) of approximately 60 single-family residences three-quarter mile from the collection site, all on septic tanks. Contemporaneous surveys of adjacent upstream counties, Marion and Schley, documented an even greater sparsity of development. The general soil survey indicates this area, including the location of the subdivision, to be well suited for septic tank drain fields. The subdivision is separated from the creek channel by approximately 2,000 feet of wetland buffer. Septic problems in this area were not identified as a possible source by the public or the Sumter County Health Department. Consequently, malfunctioning septic systems are not at this time suspected of being a significant contributor.

The watershed is located in an area of high groundwater pollution susceptibility, a characteristic

influenced by such factors as depth to water, net recharge, aquifer media, soils, slope, impact of vadose zone, and hydraulic conductivity. Under normal conditions infiltration is the natural hydrologic flow. While narrative in the TMDL explained that modeling with BASINS and NPSM did account for land use, rainfall, land slope, soil characteristics, etc., there is concern that all of the site-specific factors which facilitate infiltration and reduce storm wash were not addressed adequately or appropriately in the model. The heaviest concentrations of residential development and septic tank use in the vicinity of Muckalee Creek are in sandy soils. Sand serves as a natural filter for soluble human matter reducing the potential for return flow resulting from the interaction of groundwater and surface water.

Current Activity

Animal husbandry activity since the water quality sampling of 1995 has decreased, including the hog farm referenced earlier. As a result of declining livestock markets beef and pork production at the (Sumter) county level decreased 40% and 59%, respectively, between 1995 and 1999. Similar decreases in production are common in neighboring counties. The Plant Materials Center has maintained a small herd for research purposes, not for-profit; otherwise, any such facilities in the sub-basin in 1995 have since decreased in size or dissolved in response to declining livestock markets.

Although no change in the poultry industry has been noted, the Poultry Federation is strongly encouraging producers to participate in nutrient management planning programs. This practice will reduce the potential of excessive and indiscriminate application of poultry litter by matching the soil amendment needs of particular acreage with the nutritional value of the poultry litter to be applied. By better managing litter application, the potential risk of storm wash transporting fecal coliform to surface waters is reduced.

Housing development in the drainage basin has been light, consisting almost totally of single-family construction.

Possible External Sources

Water flows of two sub watersheds, 031300070705, which include the Muckalee, and 031300070704, converge in a wetland approximately 500 feet above the 1995 collection site (GA. Highway 30 bridge). This location is convenient for collection purposes, but samples taken at this point represent surface water from adjacent HUCs.

Two flows from the adjoining sub watershed (0704) merge with the Muckalee at this point. The smaller is primarily a drainage ditch collecting urban runoff from a \pm 250-acre basin in the City of Americus. The dominant share of this small basin is in a well-established, single-family residential land use, although a segment of U. S. Highway 19 also drains into this channel.

The larger of the two flows from the adjoining HUC discharges directly from a 100-acre lake (Lake Collins) surrounded by waterfront homes using septic tanks. Although general soils mapping indicates the area is well suited for septic tank use, proximity to the water table may impede proper drainage. Some of these households pump their septic tanks more frequently than is common in most other areas of the county. Georgia Southwestern State University has been testing this lake (2000-2001) for other parameters (N, P, K) with no unusual levels recorded.

Directly upstream (to the north) is another, smaller, less residentially developed lake (Lake Statham). All units are on septic tanks and the soil survey indicates the area is also well suited to

septic tank use. No septic problems have been reported. This lake is charged by Parkers Mill Creek, which extends approximately 3 miles further north into a low intensity agricultural area. No animal husbandry activities are believed to have existed at the time of previous testing, nor presently, and the creek is heavily buffered.

Lake Collins is also fed from the east by Angelica Creek. Angelica extends approximately five miles draining an area of low intensity agriculture (with little or no animal husbandry activity) and forest NNE of the lake.

Muckalee Creek – Upstream Americus, Sumter County
Kinchaf Boone-Muckalee Basin,
Monitoring Plan
(Refer to accompanying map, TMDL Monitoring Plan)

Because the previous collection site was located below the convergence of bilateral sub watersheds, it is proposed that collection points be established in the lower reaches of both.

Priority One: resume testing at the Georgia Highway 30 bridge site (Monitor Site #1) in conformance with standards found at 40 CFR 136. If test results fail to verify the presence of fecal coliform, presumably all testing will cease. If testing confirms fecal presence, implementation of Priority Two is recommended.

Priority Two: Simultaneous testing at monitor sites 2 and 3 should make it possible to determine which, or whether both sub watersheds should receive further testing. Monitor Site #2 is located at the south property line of the USDA Plant Materials Center near the end of sub watershed 0705 and is easily accessible off Patton Drive. The Muckalee Waders (Adopt-A-Stream) sampled previously at this site for other parameters as part of a class science project. Because of the current difficulty identifying possible contributors upstream of Monitor Site #2, confirmation of fecal at this location may necessitate alternative bacteriological sampling to distinguish between human and non-human generators, thereby facilitating additional investigation. If as a result of analysis of samples taken at Monitor Site 2 the source is identified as non-human, a review of agricultural activities should be undertaken to identify any possible noncompliance with BMPs.

Monitor Site #3 is located at the dam overflow site of Lake Collins. Some property owners along the lakefront have reported septic problems in recent years. Patton Drive crosses the creek approximately two hundred feet below the dam's overflow site, which can also be easily accessed from the spillway on the lake's west side. A determination of fecal presence at Monitor Site #3 should be indicative of seepage from septic tanks in Lake Collins. Depending on the total count at this site, testing at Monitor Sites #4 and #5 may be warranted.

Priority Three: Monitor Site #4 is located on U.S. Highway 19 at the Lake Statham dam overflow site, the residential lake directly upstream from Lake Collins. Monitor Site #5 is on U.S. Highway 19 where Angelica Creek discharges into Lake Collins. Depending upon the findings at Monitor Site #3, it may be necessary to determine whether any fecal coliform is being introduced from upstream through Sites #4 and #5.

As mentioned above, Georgia Southwestern State University has been actively involved with testing Lake Collins for other parameters on an unrelated project. Although the University has been active in environmental monitoring activities and studies for many years, the lab is not certified. An additional component of this plan is to obtain lab certification for the University. Funding is needed to obtain this certification as well as to perform the monitoring activities recommended in this plan.

If malfunctioning septic tanks around Lake Collins is proven to be the source of the parameter, financial assistance may be needed to correct the environmental risk. Because some lake residents have previously reported septic problems, environmental education is not expected to

be much a great need at this location. Rather, an understanding of the means of addressing the problem cooperatively may require more of an educational effort. If fecal coliform is confirmed to be due to human presence upstream of Monitor Site #2, a concerted education effort may be needed to convince residents of the cumulative environmental effects of numerous malfunctioning systems even in a sparsely developed area. Wherever fecal presence may be documented, coordination will likely be necessary with local government because of the program policies of potential funding agencies.

Potential Funding Sources

Nonpoint Source Implementation Grants (319)
Transportation Equity Act for the 21st Century
Watershed Protection and Flood Prevention Program
Watershed Assistance Grants
Capitalization Grants for Clean Water State Revolving Funds
Water Quality Cooperative Agreements

STATE OF GEORGIA

TMDL IMPLEMENTATION PLAN FOR: Muckalee Creek
(STREAM)Fecal Coliform
(PARAMETER)RIVER BASIN: Flint
PLAN DATE: March 31, 2001

Prepared by: <u>Gerald Mixon</u> <u>Middle Flint</u> Regional Development Center Address: <u>228 West Lamar Street</u> City: <u>Americus</u> State: <u>GA</u> Zip: <u>31709</u> e-mail: <u>gmixon@sowega.net</u> Date Submitted to EPD: <u>March 31, 2001</u>		Or Prepared By: _____ Address: _____ City: _____ State: _____ Zip: _____ e-mail: _____ Date Submitted to EPD: _____	
<p style="text-align: center;">General Information</p> <p>Obtain this information from the TMDL document or other information. When completed, this document will be a self-contained report independent of the TMDL document.</p>		<p style="text-align: center;">Significant Stakeholders</p> <p>Identify local governments, agricultural organizations or significant land holders, commercial forestry organizations, businesses and industries, and local organizations including environmental groups with a major interest in this water body.</p> <p style="text-align: center;">Additional stakeholders are identified on page 7.</p>	
TMDL ID (to be entered by EPD)	FLT0000004	Name/Organization	Sumter County Board of Commissioners
Water body name	Muckalee Creek	Address	P. O. Box 295
HUC basin name	Kinchafoonee-Muckalee Cr	City	Americus
HUC number	03130007	State	GA
Primary county	Sumter	Zip	31709
Secondary county		Phone	229-924-3090
Primary RDC	Middle Flint	Name/Organization	City of Americus
Secondary RDC		Address	P. O. Box M
Water body location	Muckalee Creek	City	Americus
	Upstream Americus	State	GA
Miles or area impacted	5 miles	Zip	31709
Parameter addressed in plan	Fecal coliform	Phone	229-924-4413
Water use classification	fishing	Name/Organization	Sumter County Farm Bureau
Degree of impairment	Partially supporting use X	Address	P. O.Box 1104
	Not supporting use	City	Americus
Date TMDL approved by EPA		State	GA
Impairment due to	Point sources	Zip	31709
	Nonpoint sources X	Phone	-
	Both	Name/Organization	Muckalee Waders
Point source-Form A; Nonpoint source-Form B; Both-Form A+B+C		Address	1901 Valley Drive
		City	Americus
		State	GA
		Zip	31709
		Phone	-
		Name/Organization	Muckalee Waders
		Address	1901 Valley Drive
		City	Americus
		State	GA
		Zip	31709
		Phone	-

If more, add to comments on last page.

FORM B

SUMMARY OF ALLOCATION MODEL RESULTS FROM TMDL DOCUMENT (existing load, target TMDL, and needed reduction)

EXISTING LOAD	TARGET TMDL	NEEDED REDUCTION
212 ccu/100 ml	175 ccu/100 ml	37 ccu/100 ml

I. IDENTIFY NONPOINT SOURCE CATEGORIES AND SUBCATEGORIES OR INDIVIDUAL SOURCES WHICH MUST BE CONTROLLED TO IMPLEMENT LOAD ALLOCATIONS:

List major nonpoint sources contributing to impairment including those identified in TMDL document.

SOURCE	DESCRIPTION OF CONTRIBUTION TO IMPAIRMENT	RECOMMENDED LOAD REDUCTION (FROM TMDL)
Agriculture pervious	Agriculture or pasture land	50%
Urban pervious	Septic tanks	50%

II. DESCRIBE ANY REGULATORY OR VOLUNTARY ACTIONS INCLUDING MANAGEMENT MEASURES OR OTHER CONTROLS BY GOVERNMENTS OR INDIVIDUALS THAT WILL HELP ACHIEVE THE LOAD ALLOCATIONS IN THE TMDL:

See the attachment for more instructions.

Existing or required regulatory actions

RESPONSIBLE GOVERNMENT, ORGANIZATION OR ENTITY	NAME OF REGULATION/ORDINANCE	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
EPD	Concentrated animal feedlot operations	Enforcement of wastewater treatment regulations applicable to feedlot operations	09-74	enforced as needed
Sumter County	Zoning	Regulates land uses	07-00	active
Sumter County	Wetlands protection ord	Prohibits development in wetlands	01-01	active
Sumter County	Groundwater recharge area protection ordinance	Regulates development in areas of significant groundwater recharge	01-01	active
Sumter County Health Dept.	State rules and regs. for on-site sewage mgt. sys.	Regulates installation of septic tanks	01-98	active
Sumter County	Flood Damage Prevention Ordinance	Regulate development in floodways which might otherwise raise the elevation of	04-95	active

		flood waters		
Sumter County	Erosion & Sedimentation Control Ordinance	Regulates land-disturbing activity	1970s	active
City of Americus	Zoning	Regulates land uses		active
City of Americus	Wetlands protection ord	Prohibits development in wetlands	10-99	
City of Americus	Groundwater recharge area protection ordinance	Regulates development in areas of significant groundwater recharge	06-00	active
City of Americus	State rules and regs. for on-site sewage mgt. sys.	Regulates installation of septic tanks	01-98	active
City of Americus	Flood Damage Prevention Ordinance	Regulate development in floodways which might otherwise raise the elevation of flood waters	12-98	active
City of Americus	Erosion & Sedimentation Control Ordinance	Regulates land-disturbing activity	02-90	active

Existing voluntary actions

RESPONSIBLE ORGANIZATION OR ENTITY	NAME OF ACTION	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Ag producers	Best Management Practices	Maximize production without causing deleterious effects on other resources	1990s	active
Ag producers; Farm Service Agency	Conservation Reserve Program	Stream buffers, grassed or wooded	1985	active
Ag producers; Natural Resources Conservation Service	Environmental Quality Incentives Program	State Priority Program	1997	needs funding
Muckalee Waders	Adopt-A-Stream	Volunteer program active in watershed surveys, visual surveys, biological monitoring, chemical testing, clean ups	1996	semi-active
Sumter County Stream Team	Adopt-A-Stream	Volunteer program active in watershed surveys, visual surveys, biological monitoring, chemical testing, clean ups	1995	semi-active

Additional recommended regulatory or other measures which should be implemented to reduce the loads of the TMDL parameter

ENTITY/ORGANIZATION RESPONSIBLE	NAME OF PROPOSED REGULATION/ORDINANCE/ OTHER	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Georgia Southwestern State University	Laboratory certification	University has history of activism in environmental monitoring, but lacks certified laboratory	Year 1	Needs funding

Sumter County Health Department	Public education	Disseminate information concerning environmental risks of malfunctioning septic tanks	Year 1	Pending monitoring, may need funding
Lake Collins Homeowners Assn	Lakefront survey	Survey all lakefront homeowners to determine the number, nature and frequency of septic problems	Year 1	Coincident with testing
Sumter County and/or City of Americus	Assume lead agency role, as needed	Some potential sources of financial assistance require active participation of local government in application for funding to reduce loading (correct septic tank seepage)	Year(s) 1 - 2	Pending monitoring, needs funding

III. SCHEDULE FOR IMPLEMENTING MANAGEMENT MEASURES OR OTHER CONTROL ACTIONS:

These **must be implemented within five years** of when the implementation plan is accepted by EPA.

IMPLEMENTATION ACTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Form stakeholders group	X				
Organize implementation work with stakeholders and local officials to identify remedial measures and potential funding sources	X	X	X*		
Identify sources of TMDL parameter	X	X*			
Develop management programs to control runoff including identification and implementation of BMPs (Phase I):	X*	X*			
Agriculture					
Forestry					
Urban	X	X*			
Mining					
Organize and implement education and outreach programs	X	X			
Detect and eliminate illicit discharges	X	X	X	X*	
Evaluate additional management controls needed		X	X	X	X*
Monitor and evaluate results		X	X	X	X*
Reassess TMDL allocations		X	X	X*	
Provide periodic status reports on implementation of remedial activities		X	X	X*	X*
If needed, begin process for Phase II (next 5 years) and subsequent phases					X

*As needed

IV. PROJECTED ATTAINMENT DATE AND BASIS FOR THAT PROJECTION:

The projected attainment date is 10 years from acceptance of the implementation plan by EPA.

- Number of management controls and activities already implemented	<u>18</u>
- Number of management controls and activities proposed in five-year work program	<u>4</u>
- Number of management controls and activities actually implemented in five-year work period	<u> </u> (to be completed after 5 years)
- Stream sampled to identify areas of concern	<u>See monitoring plan</u>
- Other _____	<u> </u>
- Other	

Monitoring data that placed stream on 303(d) list will be provided if requested.

Describe previous or current sampling activities or other surveys to detect sources or to measure effectiveness of management measures or other controls.

ORGANIZATION	TIME FRAME	PARAMETERS	PURPOSE	STATUS

Describe any planned or proposed sampling activities or other surveys. (Scheduled EPD sampling can be found in the Basin Planning document.)

ORGANIZATION	TIME FRAME	PARAMETERS	PURPOSE	STATUS
EPD	2000	Fecal coliform	basin planning	underway
Georgia Southwestern State University (or OMI)	Year 1 (2001)	Fecal coliform	TMDL Implementation Plan	Pending plan approval and funding

- % concentration or load change
 - 50% reduction in loading and/or resultant concentrations from agriculture or pasture land uses
 - 50% reduction in loading and/or resultant concentrations from urban land use

- Categorical change in classification of the stream
delisting Muckalee Creek from 303d is the goal of this plan
- Regulatory controls or activities installed
monitor results of programs and activities undertaken
- Best management practices installed (agricultural, forestry, urban)
Review agriculture BMPs to identify possible instances of nonconformance

COMMENTS - refer to accompanying text
Additional Stakeholders from page 1:

Angelwood Investments, Inc
Thomas A. Barr
Donald Ramon and Aretha Sanders Bates
Jean Schmidt Bowen
City of Americus
Bob G. Deaver
C. Melvin and Sheila A. Fulghum
Eric Keith Gary
Randy and Nannie Hollis
Howard Johnson
Robert E. Lashley, Jr.
Ruby McIlwraith
Magnolia Manor
Wallace D. Mays
Oscar Lee Mercer
John J. Neely
Thomas and Frankie V. Odom
Reeves Construction Company
Marvin Robert Saint
Natural Resources Conservation Service
Dorothy Schmidt
Shelter Development, Inc.
Mark E. and Melissa F. Simmons
John C. Taylor
Eddie Tyson, Jr.
Vigoro Industries, Inc.